Supplementary Materials for

Sodium storage in hard carbon with curved graphene platelets as the basic structural units

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**Fig. S1** Photographs of sweet-gum tree and sweet gum.
Fig. S2 The curvature of graphene layer measured for the hard carbon processed at (a) 800, (b) 1000 and (c) 1200°C. The curvature is measured by dividing the actual length of a graphene (yellow dotted lines) with the length of the straight line connecting the beginning and ending points (red dotted lines).
Fig. S3 N$_2$ adsorption/desorption isotherms (a) and the pore size distribution curve (b) of SGHC-800, SGHC-1000 and SGHC-1200.
Fig. S4 Discharge/charge curves of (a) SGHC-800, (b) SGHC-1000 and (c) SGHC-1200 at a current density of 50 mA g\(^{-1}\) for 40th cycle.
Fig. S5 Low-magnification TEM image of SGHC-1000 particle, before sodiation (a) and after sodiation (b).
Fig. S6 STEM images of a pristine SGHC-1000 particle before cycle collected by a high-angle annular dark field detector (a) and a bright field detector (b). STEM images of a SGHC-1000 particle cycled 100 cycles at a current density of 50 mA g$^{-1}$ collected by a high-angle annular dark field detector (c) and a bright field detector (d).
Fig. S7 STEM images of a SGHC-1000 particle before cycle (a), after 100 cycles at a current density of 50 mA g$^{-1}$ (b). The graphene interlayer distance are measured and labeled.
II. Formula for parameters of hard carbon

\[ d_{002} = \frac{\gamma}{2 \sin \theta_{002}} \]  

\[ Lc = \frac{0.89 \times \gamma}{B_{002} \times \cos \theta_{002}} \]  

\[ n = \frac{Lc}{d_{002}} \]  

\[ La = \frac{1.77 \times \gamma}{B_{100} \times \cos \theta_{100}} \]

The parameters (graphene interlayer distance \( d_{002} \), thickness of graphene layers \( Lc \), number of graphene layers \( n \), average lateral length \( La \)) are calculated from the x-ray diffraction spectra, where \( \lambda \) is the wavelength of Cu Ka radiation, \( \theta \) is the diffraction angle in radians, and \( B \) is the half maximum intensity in radians.
III. Supplementary Video

**Video S1.** In-situ TEM observation of sodiation of SGHC-1000 hard carbon particle under a potential bias of -3V. The frame speed is 64-times faster than real time.